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(54) Title: NEW TYPE OF CATALYTIC MATERIALS BASED ON ACTIVE METAL-HYDROGEN-ELECTRONEGATIVE ELEMENT COMPLEXES INVOLVING HYDROGEN TRANSFER

(57) Abstract: The present invention relates to a composition of matter prepared in accordance with a method comprising the steps of: (a) combining a substance selected from the group consisting of: metal or metalloid, or an alloy thereof, or a compound thereof, or an homogeneous or inhomogeneous combination of at least two of the metal or metalloid, the alloy thereof, or the compound thereof, with a source of hydrogen, to form a first intermediate, (b) milling the first intermediate to effect reaction between the substance and the hydrogen to form a second intermediate, (c) combining the second intermediate with a source of an electronegative element, to form a third intermediate, and (d) milling the third intermediate to effect reaction between the second intermediate and the electronegative element. The composition of matter could be used as a hydrogen transfer facilitator or catalyst to enhance the kinetics of hydrogenation and dehydrogenation reactions.

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